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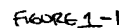
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(57) The invention is apparatus for performing beating heart surgery, in which a single articulating arm supports multiple suction pods. Once the suction pods are applied to the heart surface, tightening a cable fixes the arm in place. Then, the suction pods may be spread apart from each other to tighten the surface of the cardiac tissue lying between the suction pods. In one embodiment, fixation of the arm as well as the spreading apart of the suction pods may occur concurrently or almost concurrently through the tensioning of a single cable. Additional embodiments of the method, system and its components are shown.



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## EUROPEAN SEARCH REPORT

Application Number  
EP 99 30 7331

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (InCL7)
X	EP 0 791 330 A (CARDIOTHORACIC) 27 August 1997 (1997-08-27)	1-11, 18-21, 45,46, 78,79, 82-88, 110, 114-118	A61B17/02
Y	* column 37; figures 10B,30,42,65 *	63-67, 94,96	
A	* figures 33,75 *	29	
A	* figure 32C *	14	
X	* figure 32B *	12,57,58	
X	* figure 32C *	13,59	
	* figure 60 *		
X	* column 14, line 28 *	89,90	
A	* figures 18,44 *	93,99	
A	* figures 32,18 *	98	
X	* column 31, paragraph 2; figure 32 *	104-106	
X	DE 297 08 050 U (RIESS) 17 July 1997 (1997-07-17)	119,123, 124	TECHNICAL FIELDS SEARCHED (InCL7)
Y		94,96	
A	* figures 3,4,10 *	12-14	A61B
Y,D	US 5 727 569 A (BENETTI) 17 March 1998 (1998-03-17) * figures 8,9 *	63-67	
A	* figure 7A *	80	
A	WO 98 10705 A (MINNESOTA SCIENTIFIC) 19 March 1998 (1998-03-19) * abstract; figures 1,2,4 *	29,122	
A	WO 98 17182 A (GENZYME) 30 April 1998 (1998-04-30) * page 15, last paragraph; figure 16 *	29	
-/--			
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 26 April 2000	Examiner Barton, S
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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Application Number

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**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

**LACK OF UNITY OF INVENTION**

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

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## EUROPEAN SEARCH REPORT

Application Number  
EP 99 30 7331

DOCUMENTS CONSIDERED TO BE RELEVANT				
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)	
A	EP 0 808 606 A (USSC) 26 November 1997 (1997-11-26) * figures 41,42,50 *	90,93,99		
A	EP 0 167 345 A (MICRA) 8 January 1986 (1986-01-08) * page 7 *	92,93, 99,100		
A	US 3 786 815 A (ERICSON) 22 January 1974 (1974-01-22) * column 1, line 44 - column 2, line 15 *	91		
A	US 4 711 247 A (FISHMAN) 8 December 1987 (1987-12-08) * column 3, paragraph 2 *	107		
A	US 3 951 138 A (APOKOV) 20 April 1976 (1976-04-20) * abstract; figure 1 *	104,105		
A	US 5 749 892 A (VIERRA) 12 May 1998 (1998-05-12)			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	WO 98 27869 A (UNIVERSITY OF MASSACHUSETTS) 2 July 1998 (1998-07-02)			
D,A	WO 97 10753 A (MEDTRONIC) 27 March 1997 (1997-03-27)			
P,X	WO 99 16367 A (ALLIANCE) 8 April 1999 (1999-04-08)  * page 5, line 6 - line 9; figures 1,7,12,13 *	1,94-97, 119-121, 123		
-/--				
The present search report has been drawn up for all claims				
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>26 April 2000</b>	Examiner <b>Barton, S</b>	
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons S : member of the same patent family, corresponding document		

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European Patent  
OfficeLACK OF UNITY OF INVENTION  
SHEET BApplication Number  
EP 99 30 7331

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

## 1. Claims: 1-11,18-21,45,46,78,79,82-88,110,114-118

Tissue immobilising system with movable paddles, in particular with a combination of malleable conforming and suction gripping

## 2. Claims: 1,22-25

Tissue immobilising system with movable paddles, with spreading means including a spreadable saddle

## 3. Claims: 1,29,31-38

Tissue immobilising system with movable paddles, with independent spreading of first and second paddles

## 4. Claims: 1,14-17,39-44,47-52

Tissue immobilising system with movable paddles, with hinged spreading means

## 5. Claims: 1,53-56,81

Tissue immobilising system with movable paddles, with simultaneous paddle spreading and arm locking

## 6. Claims: 1,12,20,30,57,58

Tissue immobilising system with movable paddles, with parallel paddle spreading

## 7. Claims: 1,13,59-62

Tissue immobilising system with movable paddles, with non-parallel paddle spreading

## 8. Claims: 1,63-77

Tissue immobilising system with movable paddles, with multiple suction ports on a single surface

## 9. Claims: 1,80

Tissue immobilising system with movable paddles, with

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## EUROPEAN SEARCH REPORT

Application Number  
EP 99 30 7331

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
P, X	EP 0 920 835 A (ETHICON) 9 June 1999 (1999-06-09) * paragraphs '0036!', '0040!'; figures 12, 13 * -----	1, 63	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>26 April 2000</b>	Examiner <b>Barton, S</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**LACK OF UNITY OF INVENTION  
SHEET B**

Application Number  
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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

special arrangement of suction source, suction port and  
paddle and port surfaces

10. Claims: 1,89-93,99-103

Tissue immobilising system with movable paddles, with  
special construction of flexible arm

11. Claims: 1,26-28,94-98,110-113,119-126

Tissue immobilising system with movable paddles, with  
spreading actuator remote from paddles

12. Claims: 1,104-109

Tissue immobilising system with movable paddles, with paddle  
with puncturing and dispensing capability

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ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

26-04-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 791330 A	27-08-1997	US 5894843 A	20-04-1999
		AU 1480597 A	28-08-1997
		BR 9701028 A	03-11-1998
		CA 2197614 A	21-08-1997
		JP 10005230 A	13-01-1998
		NO 970753 A	21-08-1997
		US 6036641 A	14-03-2000
DE 29708050 U	17-07-1997	WO 9849947 A	12-11-1998
		EP 0981297 A	01-03-2000
US 5727569 A	17-03-1998	AU 1478797 A	28-08-1997
		BR 9701030 A	03-11-1998
		CA 2197608 A	21-08-1997
		EP 0791329 A	27-08-1997
		JP 11019096 A	26-01-1999
		NO 970751 A	21-08-1997
		US 5906607 A	25-05-1999
		US 6032672 A	07-03-2000
WO 9810705 A	19-03-1998	US 5899627 A	04-05-1999
		EP 0866673 A	30-09-1998
		JP 2000501323 T	08-02-2000
WO 9817182 A	30-04-1998	AU 4599697 A	15-05-1998
		EP 0944356 A	29-09-1999
EP 808606 A	26-11-1997	US 5967973 A	19-10-1999
		AU 1911497 A	30-10-1997
		CA 2202833 A	26-10-1997
		JP 10052430 A	24-02-1998
		AU 1911597 A	30-10-1997
		CA 2202838 A	26-10-1997
		EP 0803228 A	29-10-1997
		JP 10033543 A	10-02-1998
		US 5947896 A	07-09-1999
EP 167345 A	08-01-1986	GB 2166190 A	30-04-1986
		JP 61092306 A	10-05-1986
US 3786815 A	22-01-1974	NONE	
US 4711247 A	08-12-1987	AU 615161 B	26-09-1991
		AU 7356987 A	09-11-1987
		BR 8707670 A	15-08-1989
		CA 1306673 A	25-08-1992

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## EP 0 993 806 A3

ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

EP 99 30 7331

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The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

26-04-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4711247 A		DK 663887 A	16-12-1987
		EP 0303618 A	22-02-1989
		FI 884802 A	18-10-1988
		JP 1502718 T	21-09-1989
		WO 8706115 A	22-10-1987
		US 5605160 A	25-02-1997
		US 5588441 A	31-12-1996
		US 5027826 A	02-07-1991
		US 5154181 A	13-10-1992
		US 5735288 A	07-04-1998
		US 5335670 A	09-08-1994
US 3951138 A	20-04-1976	SU 449525 A	15-05-1976
		CA 1034825 A	18-07-1978
		CH 583545 A	14-01-1977
		DE 2434883 A	27-03-1975
		FR 2238463 A	21-02-1975
		GB 1457365 A	01-12-1976
		IT 1034067 B	10-09-1979
US 5749892 A	12-05-1998	US 6017304 A	25-01-2000
		US 5807243 A	15-09-1998
WO 9827869 A	02-07-1998	AU 5803798 A	17-07-1998
WO 9710753 A	27-03-1997	US 5836311 A	17-11-1998
		AU 7241496 A	09-04-1997
		BR 9610670 A	06-07-1999
		CA 2232580 A	27-03-1997
		CN 1198664 A	11-11-1998
		EP 0939605 A	08-09-1999
		JP 11511366 T	05-10-1999
		NO 981289 A	19-05-1998
		US 6015378 A	18-01-2000
		US 5927284 A	27-07-1999
WO 9916367 A	08-04-1999	AU 9664398 A	23-04-1999
EP 920835 A	09-06-1999	US 6007486 A	28-12-1999
		AU 8831798 A	29-04-1999
		CA 2249655 A	07-04-1999
		JP 11192226 A	21-07-1999

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